REMARKS

Office Interview

As an initial matter, applicant wishes to sincerely thank the Examiner for granting a personal interview to discuss the instant invention on June 14, 2007. A copy of the Examiner's Interview Summary is attached with this communication for reference. In the June 14 interview, applicant presented a video demonstration of the lateral electrodeposit growth rate acceleration characteristic of directly electroplateable resins (DER) as defined in the instant specification, materials which are within the scope of the instant invention. It was explained that this growth acceleration is important in successfully producing the selectively electroplated articles of the instant invention. Applicant suggested that he compose informal prototype claims based on patterning of DER materials for examiner's review.

Claim Amendments

This amendment cancels claims 1 through 25 and adds new claims 26 through 45.

New independent claim 26 is supported by the discussion in paragraphs 0103, 0104 and 0130. It calls for a material having the ingredients defined as constituents of a directly electroplateable resin, the material having a pattern positioned **on** an insulating material, and wherein an electrodeposit overlays the material only (i.e. selectively electrodeposited). Here the insulating material would not perform as a "mask" since a masking material would be "on" the electroplateable resin not visa versa.

New independent claim 39 defines an article having **multiple molded** materials, a first comprising ingredients defined as constituents of a directly electroplateable resin, wherein the first material directly contacts an electrodeposited metal. Support for new independent claim 39 can be found in Figures 1, 3, and 7-9, and the related discussion of the figures in the specification as filed, and in Examples 1 and 3.

New independent claim 43 calls for a selectively electroplated article in the form of a continuous planar structure that can be processed in roll-to-roll fashion. It is avered that such a characterization is widely used and understood in the art as describing a form (sheetlike and flexible) that can be continuously processed. Support for new independent claim 43 may be found in Figures 10 through 22 and the related discussion of these figures in the specification as filed.

Support for the dependent claims is found in the specification as originally filed as follows:

Claim 27 is supported by Figures 2 and 2A and the relevant discussion.

Claim 28 is supported by Figures 12-24, and Paragraphs 117, 119 and 120.

Claim 29 is supported by Figures 15-22 and Paragraphs 115,120,121,124, 125.

Claim 30 is supported by is supported by Paragraph 47.

Claim 31 is supported by Figures 10-14 and Paragraphs 113 and 117.

Claim 32 is supported by Paragraphs 105 and 124.

Claim 33 is supported by Figures 12-14 and Paragraphs 117-119.

Claim 34 is supported by throughout the specification and specifically at Paragraphs 17, 40-41 and 134.

Claim 35 is supported by Paragraph 018.

Claim 36 is supported by the teachings in Paragraphs 16 and 17.

Claim 37 is supported by paragraph 46 and Examples 1, 2, and 3.

Claim 38 is supported by paragraph 46 and Examples 1, 2, and 3.

Claim 40 is supported by Figure 1, Paragraph 106 and Example 1, Paragraph 139.

Claim 41 is supported by Figure 1, Paragraph 106 and Example 1, Paragraph 139.

Claim 42 is supported by Figures 7 and 9, the description of these Figures in Paragraph 112, and Paragraph 18.

Claim 44 is supported by Figures 10 and 11 and Paragraphs 113-116.

Claim 45 is supported by Figures 15-22 and Paragraphs 120-126.

Comments on 05/02/2007 Patent Office Action

Applicant maintains that the newly presented claims are patentably distinct from the references of record, either alone or in combination. Nevertheless, applicant would like to comment on positions advanced in the 5/02/2007 Patent Office Action "for the record".

Overall Comments Regarding Selective Electroplating

The examiner has stated an opinion that whether the metal coating is patterned (selective) or not is only part of a design scheme and is conventional. Applicant respectfully disagrees. Complete electrodeposit coverage of a substrate is normally far less complex than selective metal coverage. Selective metal deposition has its own unique and often difficult requirements compared to complete deposit coverage. A first consideration is the definition of the boundary line between the plated and unplated surfaces. One normally wishes this to be as smooth and defined as possible. However, this can be difficult, as verified in the Hans U.S. Patent 4,224,118 at column 1, lines 35-45. A major concern is the tendency for electrodeposits to preferentially deposit at an edge between conductive and nonconductive regions. This is a result of the bath having a higher current carrying capacity in the region of an edge as compared to a broad surface. This situation can result in a ragged or raised edge of electrodeposited metal at the boundary, a condition commonly referred to in the industry as edge "berry buildup". In some cases the extra stresses associated with the increased metal electrodeposit at edges actually cause the metal to pull away from the substrate. Thus, adhesion values can be of added concern in a selectively electroplated article. Alternately, if the substrate is in the form of a thin film, substrate curling at edges can be a problem. A further concern is that the electrodeposit in a selectively electroplated article is normally a projection above the surface. In an effort to keep the surface as smooth as possible, electrodeposit thickness should be reasonably uniform and at a minimized thickness consistent with other requirements. If there is significant nonuniformity in electrodeposit thickness, aesthetic and performance issues arise. Using conventional conductive resin substrates having low

current carrying capacity and absent a coverage rate accelerator, significant variations in electrodeposit thickness can occur over extended lengths. This was evident from the video shown the examiner at the June 14th office interview. Finally selective electroplating not only requires coverage of long, thin traces with fine line definition and good adhesion, but also suitability of coatings and thermoplastic compounds for fabrication and low cost. It is only through his independent and private development that the applicant is aware of the unique suitability of directly electroplateable resin technology for production of a myriad of selectively electroplated structures.

Specific Comments on the Cited References

The examiner relied on four references in rejecting all prior claims. These are:

Bogard et al., U.S. 3,772,161

Hans U.S. 4224118

Adelman U.S. 4,038,042

Kawai et al. U.S. 4,425,262

The examiner stated that "Bogard was used only to show a mask or a resist are well known method to be utilized in electroless or electroplating processes". However, the Examiner appears to be taking the position that Hans, Adelman, and Kawai all teach directly electroplateable resins.

A. Regarding Hans, the examiner states on page 5 that "The metal coating is selectively electroplated onto the surface of the plastic substrate (col 1, L8-9 and L15-21). What is said there is as follows.

-"...the method incorporating a permanent polymeric stop-off material on the unplated portions."-

-"The electrolytic deposition of metal coatings onto plastic or metal substrates is a well-known industrial art. It is often desirable, particularly where the metal coating is provided for decorative purposes to plate only selected areas of the surface. Heretofore this has been done by masking the unplated portions with a temporary layer of polymeric material."-

These statements are part of the background where examples of such "well known industrial art" are also given. Hans's example of plastics "electrolytic deposition" is Bogard, U.S. 3,772,161. Bogard clearly teaches preplating and electroless plating prior to electroplating. Hans further states that masking was a problem with Bogard, and Hans asserts his invention was an improvement in the mask. Hans makes no suggestion that the preplating of Bogard was eliminated in his invention.

The examiner further states on page 6 that "Hans never teaches any electroless plating. In fact, Hans' preplating step is electrolytically deposited (col 2 L 5-8 & col 4 L 55-62)" What is said there is as follows.

> -"...(ABS) part were successively electrolytically coated with preplate and chrome finish layers."- (Col.2, L 5-8)
>
> -" ... coating onto selected surface portions of an electroplateable metal or polymer substrate comprising the steps of
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> shielding surface portions of the substrate to be electrolytically coated;
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> applying a polymeric coating layer to surface portions of the substrate exposed by the shielding; and
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> subjecting the substrate to electrolytic deposition such that a layer of metal is deposited on surface portions not covered by the polymeric coating layer; ..." (Col. 4 L 55-64)

Applicant wishes to point out that the common industry terms "electroplating onto plastic", "electrolytically coating a plastic" and "electroplateable plastics" as used in the conventional sense are misnomers. One cannot "electrolytically coat" an insulating surface. Actual conventional practice is to first apply a thin metal layer over the insulating plastic surface using electroless deposition. Subsequently, a metal may be electrodeposited onto the conductive thin electrolessly applied metal layer. Hans's statement "...(ABS) part were successively electrolytically coated with preplate and chrome finish layers" (Col.2, L5-8) is very "loose" language. Applicant knows of no way to "electrolytically preplate" an insulating ABS resin. Further, applicant notes the description of the Example I of Hans, specifically Col 3, lines 5 – 10, where it states, "...strongly adhered to the ABS substrate. The part was the pretreated for plating with a

strongly acidic, oxidizing solution to render the surface hydrophilic. The surface was neutralized and the treated with a strongly acidic plating activator containing tin and palladium salts..."These chemical steps are indeed standard preplating steps to activate electroless plating for plastics such as ABS. While the words "electroless plating" were not specifically used by Hans, it is clear electroless plating was employed. One cannot "electrolytically" treat or coat an insulating plastic such as the "plateable grade of ABS" (Col 2, L 51) without first depositing a conductive coating via a "preplating" process. Thus, it is improper to use Hans (U.S. 4224118) as an anticipatory reference for the following reasons.

1. Hans does indeed teach preplating prior to electroplating.
2. Hans' ABS substrate compositions are in no way remotely similar to the definition of a directly electroplateable resin found in paragraph 0047 of the instant spec.

B. Regarding Adelman, the Examiner states;

"Adelman teaches a plastic composition which can be directly electroplated with metal" (Page 4). However, this statement directly conflicts with the description of the Adelman process in column 16 of the Adelman 4,038,042 patent. There it states that the molded article requires a preparation treatment prior to electroplating. The process comprises at a minimum.

- Strong oxidizing acid dip to condition the surface for 5 or more minutes. This presumably etches the surface and renders it hydrophilic.
- Water rinses
- NaOH rinse optionally augmented with ultrasonic agitation.
- Water rinses.

Thus the Adelman process is clearly not in conformity with the Examiner's own position that "directly electroplateable" means no surface pretreatment. In addition, the Adelman compositions, while containing carbon black, contain no electrodeposit coverage rate accelerator as required by the definition of directly electroplateable resisns (DER) in paragraph 47 of the specification and the instant claims. Finally, the electrodeposit

coverage rates reported by Adelman (approximately 1 inch per minute) would be unsuitable for most selectively electroplated articles, as explained above.

C. Regarding Kawai et al., the Examiner correctly states that the compositions of the reference contain polymer, sulfur, trithiolcyanuric acid and carbon black. The Examiner states that "Kawai does not state any specific structure of his article". However, the Kawai examples did indeed employ flat rigid plates having dimensions approximately 3.15 inch X 6.3 inch X thickness .079 inch (column 4, lines 14-15). The samples were totally encapsulated with electroplated metal to a plating thickness of greater than .002 inch. Thus, Kawai et al. teach a non-discriminating electroplating technique, fully covering a rigid single material substrate. Kawai et al. make no mention or suggestion of suitability of their compositions for the specialized requirements of selective electroplating. As noted by the examiner, Kawai et al. is silent regarding whether "the metal coatings are selectively plated (or patterned)". Indeed, the reference is not only silent, it teaches away from such selectivity. The reference examples describe flat plates, about .079 inch thick. The plates are plated with electrodeposits some .002 inch thick. While such large thicknesses may be appropriate (and indeed advantageous) for an article entirely covered or encapsulated with electrodeposit such as the Kawai plates, such thicknesses could be inappropriate for a selectively electroplated article because of edge effects, electrodeposit stress, and surface irregularities as explained above. Kawai is also silent concerning the importance of accelerating electrodeposit coverage rates when considering selective electroplating. There is no evidence that the Kawai technology ever achieved any commercial success. Thus, neither the patent teaching nor commercial experience would persuade a person of normal skill in the art to choose the Kawai et al. teachings for selective electroplated structures.

Conclusion

Applicant states that all the newly presented claim limitations have proper antecedent basis and support in the specification as originally filed. Because the changes introduce

no new matter, their entry is respectfully requested. Applicant further maintains that the known prior art is devoid of teaching or suggestion, either alone or in combination, of the invention as claimed in independent claims 26, 39, and 43. Allowance is respectfully requested.

Respectfully submitted,

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